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AUTHOR Tamaoka, Katsuo
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ABSTRACT

Heavy migration into Canada and migration from Native rural communities to urban areas has made it necessary to identify appropriate instruments for assessing minority children's academic abilities. In Canada, IQ tests have been used extensively for academic placement in school. This paper reviews the literature evaluating cultural bias in IQ tests used in Canada and the United States. Studies conducted in the United States suggest that Blacks and Hispanics are at a cultural disadvantage on the major IQ tests, while Hispanics are disadvantaged in language skills as well. With respect to the mainstream Canadian population, the WISC and WISC-R contain items reflecting an American cultural bias. However, Canadianization of such items may not guarantee the proper difficulty level for the substituted items. Cultural bias against Native children is found on some WISC-R items, and degree of acculturation seems to influence IQ results of Native children. Alternative means of assessing minority children's intelligence have included culture-free (or culture-fair) tests, and recalculation of IQ scores taking into account family size, family structure, socioeconomic status, and urban acculturation to indicate "estimated learning potential." These methods did not predict school achievement more accurately than the WISC-R. While the commonly used IQ tests in Canada do not necessarily assess a child's true general ability, they are reasonably predictive of academic success in school (perhaps partly because they reflect cultural biases in school). A multiple assessment approach for minority children is recommended. This paper contains 39 references. (SV)

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Measuring Intelligence of Minority Children in Canadian Multicultural Contexts

Katsuo Tamaoka
Matsuyama University, Matsuyama, Japan

Abstract: Canadianization for the items of WISC and WISC-R would not guarantee the proper difficulty level for the substituted items. Failure of adjusting the questioning items of Information subtest indicate an American cultural bias with respect to a main-stream Canadian population. For Native children, cultural content bias against Native children is indicated in the question items of the WISC-R Information subtest. The degree of acculturation seems to influence, to a certain degree, IQ tests' results of Native children. Cultural fair tests to remove cultural effects on IQ scores did not indicate a strong predictive power for academic achievement. The attempt at computing an Estimated Learning Potential (ELP) also failed to predict a child's academic success. A simple re-calculation of WISC-R scores based on family size, family structure, socio-economic status and urban acculturation dose not indicate ELP. The two attempts at cultural free tests and ELP scores also failed to assess intelligence of minority groups as a predictor of child's school achievement. Though a compromise, but the most careful and sensitive approach to assess intelligence of Canadian minority children have to be a multiple assessment approach using already established tests as a part of the information used to assess a child's learning abilities in order to facilitate adequate education and counselling.

1. Introduction

Although an attempt to understand human intelligence has drawn extensive attention in the area of psychology, there seems to be neither a single instrument nor a clear-cut definition for intelligence to which no psychologist raises a question. A lack of consensus in studies as to the definition of intelligence indicates the intricate complexity of human intelligence. However, heavy migration into Canada and migration from Native

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rural communities to urban areas has made it necessary to identify appropriate instruments for assessing children's academic abilities in order to facilitate adequate education and counselling.

In Canada, IQ tests have been extensively used for academic placement at school. IQ tests partly reflects the main-stream culture which has passed its cultural heritage to the next generation. Although various studies in psychometrics suggest that the predictive power of these IQ tests is high enough to use for the placement of children at Canadian schools, cultural bias in IQ tests often acts as an element to decrease the predictive power of children's school achievement. Hence, the present study focused on evaluating whether newly-developed and commonly-used IQ tests in North America obtain a strong cultural bias when examining children from other social and cultural environments, and if so what would be the best approach to facilitate the proper education of those children.

2. Issues in Assessing Intelligence of Minority Groups

Canada has been inviting numerous immigrants from various countries where English and French are not necessarily spoken as an official language and are not used as an instructional langauge at school. The census of Canada in 1981 (Statistics Canada, 1984) showed that 1,608,645 people in Canada do not speak English or French as a mother tongue. Assessing intelligence of

these minority children for academic placement is one of the difficult tasks for Canadian school psychologists. Therefore, in this Section, effects of linguistic and cultural differences on IQ tests have to be considered when assessing these children. For the effects of linguistic differences, several studies in the United States, which has been experiencing cultural difficulties among minority groups longer than Canada, are used to examine the difference between verbal and performance IQs and are applied a Canadian multicultural context. For cultural bias and adjustment of IQ questioning items, 'Canadianization' of WISC-R proposed by Vernon (1976) is examined in this section.

2.1 Effects of Language Skills on Verbal Intelligence

IQ tests have been conducted on some major ethnic groups in the United States. Differences in the means of black and white Americans seem, more or less, to be duplicated in a series of studies (Jensen, 1969, 1976; Vernon 1969 for early studies and Eysenck & Kamin, 1981; Sattler 1982, 1988 for recent review). However, uncertainties remain in determining the factors influencing the results of IQ tests. Comparing the average IQs of black and white Americans, blacks seems to produce lower IQ scores than whites. This may be partly caused by culturally handicapped conditions of blacks. Yet, there is no definite explanation for it.

Although the difference in mean IQ scores between blacks and

whites is constantly reported, Johnston and Bolen (1984) and Naglieri (1986) argued that black and white Americans showed almost identical patterns in both scores of the Wechsler Intelligence Scale for Children - Revised (WISC-R) and Kaufman's Assessment Battery for Children (K-ABC). The study on the discrepancy between Verbal (VIQ) and Performance (PIQ) IQs (Taylor, Ziegler and Partenio, 1984) showed significant differences among black, white and Hispanic groups, [$F(2, 533)=16.62$, $p<.01$]. Post hoc multiple comparisons indicated that the Hispanic group had significantly larger VIQ-PIQ splits than did the white or the black group, but no significant differences were found between the black and white groups. Furthermore, as shown in Table 1, the direction of VIQ-PIQ discrepancies for black and white groups were similar, while significantly more Hispanics obtain PIQ>VIQ (74.4%) than PIQ<VIQ (23.9%). This result suggests that the Hispanic group may have a disadvantage in language skills which prevents better scores in VIQ.

Table 1

Direction of VIQ-PIQ Discrepancies by Ethnic Group

Ethnic Group	Direction of discrepancies		
	VIQ>PIQ	VIQ<PIQ	VIQ=PIQ
Black	44.1%	51.1%	4.8%
Hispanic	23.9%	74.7%	1.7%
White	44.2%	49.7%	5.9%

(Taylor, Ziegler & Partenio, 1984, p.439)

Concerning IQ tests and language skills, the comparative study, using the Peabody Picture Vocabulary Test (PPVT), the revised PPVT (PPVT-R) and placement IQ tests, was conducted among black, white and Hispanic Educable Mentally Retarded (EMR) students (Bracken & Prasse, 1981). This study concluded that mean IQs were nearly identical for the three ethnic groups. However, PPVT and PPVT-R indicated great differences in language skills; the Hispanic group scored the lowest in PPVT and PPVT-R. In addition, Teuber and Furlong (1985) conducted the research using the Expressive One-Word Vocabulary Test and PPVT-R, indicated that bilingual Mexican American children (Hispanic group) on both tests scored almost two standard deviations lower than the normative mean. With the finding of great PIQ>VIQ Hispanic population (Taylar, Ziegler & Partenio, 1984), these studies suggests that the Hispanic group has a disadvantage in taking the language-related subtests of IQ tests in comparison with black and white groups.

The findings of the American cross-cultural studies are applicable to Canadian multicultural contexts in two ways. First, the VIQ-PIQ discrepancy in IQ tests will appear between the main-stream cultural group and minority groups. Second, the disadvantage in English learning conditions (e.g., growing up in a non-English family) will affect scores of Verbal IQs, and minority students may display lower scores in language ability tests and language-related IQ tests. For those children, the VIQ-PIQ discrepancy in IQ tests should be considered with a

cross-examination of other mental and language ability tests.

2.2 Effects of Cultural Context on Intelligence Test

One of the major arguments for the use of WISC and WISC-R to assess minority groups in Canada is whether the Information subtest contains a somewhat American cultural bias. If so, is it necessary to modify the items according to groups such as French, Ukrainian, Chinese and Aboriginal Peoples (Indians, Inuit and Metis)? The first attempt to modify American IQ tests was to adjust the Information subtest for the use of Canadian children.

WISC-R, which is designed for assessing intelligence of children in America (Wechsler, 1974), contains materials related to an American context. The Information subtest in particular contains questions pertaining to American history and geography. As shown in table 2, Vernon (1976) has encouraged Canadian school psychologists to substitute the seven items of Information subtest (#16, #17, #19, #20, #21, #24 and #27) for Canadian users. However, conducting WISC-R to a randomly selected sample of 300 urban Saskatchewan children, Perters (1976) did not find any evidence of a systematic bias on the Information subtest.

Furthermore, using 342 adolescent psychiatric inpatients and outpatients, Cyr and Atkinson (1987) found that the substitutes for items #16 and #19 should be abandoned because of their unacceptably high pass rates. The study concluded not only that the ranks of difficulty order were affected by modified items,

Table 2

Canadianization items for the WISC-R Information Subtest

Item #		
16	(A)	Who invented the electric light bulb?
	(C)	Who invented the telephone?
17	(A)	From what country did America become independent in 1776?
	(C)	From what country did most of the first sellers in Canada come?
19	(A)	Name the two countries that border the United States?
	(C)	Name two oceans bordering Canada.
20	(A)	How many pounds make a ton?
	(C)	How many weeks are there in a year?
21	(A)	In what continent is Chile?
	(C)	In what continent in Sweden?
24	(A)	How tall is the average American man?
	(C)	How tall is the average Canadian man?
27	(A)	How far is it from New York to Los Angeles?
	(C)	How far is it from Toronto to Vancouver?

(Vernon, 1976)

Note: (A) is an original American item while (C) is a Canadianized item.

but also that those items were significantly easier for the respondents. Thus, the view that such a bias exists is, for the most part, based on the face validity of items, and not construct validity.

On the other hand, Marx (1984) suggested to adopt Vernon's change on the basis of his research finding with the use of both the manual items and modified items of WISC-R Information subtest comparing Canadian children (210 junior secondary school students in Burnaby, B.C.) with the American standardization group. However, as shown in Table 3, although the ranking order seems to be rearranged in a sequential order from one to seven, all seven modified items proposed by Vernon (1976) were higher than the

comparable data from the standardization group in the passing percentages. The results of Marx's study actually indicated that the Vernon's Canadianization items will cause a higher score on the Information subtest.

Table 3

Ranks and Percentage of Standardization Sample and Burnaby Sample Passing Each Item

			Burnaby Sample			
	Standardization Sample		Manual Items		Modified Items	
Item	%	Rank	%	Rank	%	Rank
16	50.7	1	38.6	3	65.7	1
17	50.0	2	41.4	2	54.8	3
19	48.9	3	45.7	1	60.5	2
20	43.9	4	32.9	6	53.3	4
21	40.2	5	37.6	4	51.4	5
24	23.1	6	34.3	5	38.6	6
27	16.4	7	10.0	7	18.1	7

(Marx, 1984, p.32)

2.3 Summary

Despite these research results, the majority of Canadian school psychologists regularly adopted the Canadianized items of the Information subtest in 1980s. Since Canadianization for WISC and WISC-R would not guarantee the proper difficulty level for the substituted items, the main purpose of substitution is to increase the face validity for use with the Canadian population. It seems impossible to avoid cultural bias in the existing IQ

tests. In addition, failure of adjusting questioning items of Information subtest indicate an American cultural bias in the main-stream Canadian population. Again, with language differences, cultural differences should be taken into account when assessing minority children for educational placement and counselling.

3. Issues of Assessing Intelligence of Native Children

A great increase of Native population (Indian, Inuit, and Metis) in urban areas has been reported by the Department of Indian and Northern Affairs (1977). In 1980, approximately 30 percent of Indians (status Indians) in Canada were estimated to live off the reservation (reserve), of which nearly 80 percent are now living in urban areas (Frideres, 1988). For example, Regina predicted to have over one-forth of the Native (status and non-status Indians and Metis) population by 1985. In 1980-1981, the cumulative drop-out rate of Native students in urban Saskatchewan was calculated 90.5 percent in Grades 7 to 12, while non-Native students were 40.0 percent (Saskatchewan, Department of Education, 1985).

This great migration of Native peoples to urban areas has created cross-cultural situations of Native students who have grown up in remote Native communities. English skills are often a major consideration for placement of Native students with their former school records. Because of the handicapped social and

cultural conditions of their English learning, Native students are often placed two or three grades lower in city schools than the ones they previously were in. Still, a high drop-out rate was reported among Native students. Hence, the placement process should be re-examined for Native students in order to provide adequate learning conditions and counselling. As for providing an appropriate assessment of intelligence for Native students' placement, studies of IQ tests should be explored to examine their fairness of information and interpretation.

3.1 Cultural Content Bias for Native Children in the WISC-R Information Subtest

Like the difference in the mean scores of IQ tests between black and white Americans, the mean scores of Native students were generally lower than the norm means of IQ tests (Goodenough, 1962; Vernon, 1966 & 1969; MacArthur, 1968 & 1969; Krywaniul & Das, 1976; Seyfort, Spreen & Lahmer, 1980; Connelly, 1983; Mueller, Mulcahy, Wilgosh, Watters & Mancini, 1986). In addition, the results of WISC and WISC-R among Native children indicated that they yield higher scores on Performance IQ than Verbal IQ. This pattern of PIQ>VIQ "may be a reflection of a visual style of learning and limited familiarity with English" (Sattler, 1982, p. 376). Furthermore, Sattler (1982 & 1988) explains that the degree of discrepancy between PIQ and VIQ may illustrate the degree of acculturation which Native peoples have

experienced.

Acculturation, however, indicates how much Native peoples adapted to the main stream culture; consequently, it should not be measured by IQ tests. For example, the items in the Information subtest, WISC-R which contain American history and geography are "Who discovered America?", "From what country did America become independent in 1776?", "Name the two countries that border the United States?", "How tall is the average American man?", "How far is it from New York to Los Angeles?" (Wechsler, 1974). Even the Canadianized items (Vernon, 1976) such as "From which country did most of the first settlers in Canada come?", "How tall is the average Canadian man?" (the average white man) also show cultural content which most Native children will not be aware of, unless they learn it at school. If the items were to be sensitized to Native children, they would be changed to "Which Indian tribe contacted to the first arrivers from Europe in Canada?", "Which is the most spoken Indian language in Canada?". The Information subtest seems to present the cultural group who has a governing power of the country.

In addition, the twelfth item of the WISC-R Information subtest, "Who discovered America?", which Vernon (1976) did not suggest to change for Canadian uses, represents an ethnocentric view of history. In current history textbooks, this statement has been replaced by the expression of the first European to arrive in America. Testing Native students, this item will affect motivation of native students to continue and compiete

WISC-R. Furthermore, there is a clear evidence that the Norse, Eirik Thorvaldsson (Eric the Red) arrived in Baffin Island in 982 (Magnussen & Palsson, 1986).

Effects of cultural content bias are shown in the study of Canadian Inuit children (Mueller, Mulcahy, Wilgosh, Watters & Mancini, 1986) which administered the nine WISC-R subtests (Object Assembly, Coding and Mazes excluded). They found that several items of the Information subtest were misplaced in rank order and the twelfth item, "Who discovered America?", was a harder question for Inuit children. Nevertheless, this research group concluded that the Information subtest is "a reasonably good measure of the WISC-R verbal construct" (p. 17). If the argument of Marx (1984) is accepted as a reason for WISC-R Canadianization, then by the same reasoning, the Information subtest should be adjusted for Inuit children.

3.2 Applying Bannatyne's Recategorization to Native Children

The another aspect of cultural bias against Native children is observed in the reorganized scores of WISC and WISC-R subtests commonly known as Bannatyne's system. Bannatyne (1974) reorganized the WISC subtests: the Spatial category (Picture Completion, Block Design and Object Assembly), the Conceptual category (Similarities, Vocabulary and Comprehension), the Sequential category (Arithmetic, Digit Span and Coding), and the Acquired Knowledge category (Information, Arithmetic and

Vocabulary). According to this recategorization of WISC, Bannatyne suggested that learning disabled (LD) children were likely to exhibit a pattern of Spatial>Conceptual>Sequential scoring order. However, this pattern is not always commonly observed among Native LD children.

Recategorization of WISC and WISC-R was examined with respect to Native children. Zarske and Moore (1982) conducted the research concerning Bannatyne's system with WISC-R for non-handicapped (N=113), learning disabled (N=150), educationally disadvantaged (N=189), and regular classroom (N=44) Navajo children. The study found that the classic Bannatyne's LD pattern failed to occur for the LD Navajo children. Instead of Bannatyne's system, all four groups of Navajo children presented a pattern of Spatial>Sequential>Conceptual scoring order. Another study on Yukima Indian tribe (Diessner & Walker, 1986) also indicated the same pattern as the study by Zarske and Moore. The pattern of Spatial>Sequential>Conceptual scoring order may be typical across American Indians; consequently, Bannatyne's system was not the pattern observed in LD children of some Indian tribes.

A further investigation of WISC-R recategorization by Connelly (1983) provided an additional factor influencing the scoring pattern of Bannatyne's system. With WISC-R administered to 146 LD Tlingit children in southwestern Alaska for whom English was the first language, Connelly found that an younger LD group at the ages of 6 to 10 displayed Bannatyne's LD pattern of

Spatial>Conceptual>Sequential scoring order while an older group at the ages of 11 to 16 exhibited the typical Indian pattern of Spatial>Sequential>Conceptual. In addition, the study of 81 Chippewa, Muncey and Oneida children from two reserve schools in southwestern Ontario (English was also the first language) exhibited the LD sequence of the Bannaytne's recategorization in WISC-R (Scaldwell, Frame & Cookson, 1985). Since both studies used Indian children who speak English as their first language, as McShane and Plas (1982) suggested, it could be assumed that LD Indian children from more traditional settings tended to produce the typical Indian pattern in WISC-R while more acculturated LD Indian children displayed Bannatyne's pattern. Thus, the degree of acculturation towards the main-stream English speaking culture could be an additional factor to exhibit Bannatyne's recategorization of WISC-R subtests differently.

3.3 Summary

For measuring intelligence of Native children, cultural content bias against Native children is indicated in the question items of the WISC-R Information subtest. In addition, Bannaytne's recategorization of WISC and WISC-R subtests suggested that the scoring pattern for LD children was Spatial>Conceptual>Sequential. However, Indian children from traditional settings were likely to exhibit the pattern of Spatial>Sequential>Conceptual which is commonly known as the

typical Indian pattern. The degree of acculturation seems to influence, to a certain degree, Bannaytne's recategorization of intelligence among Native children. Hence, interpretation of the intelligence tests results (e.g., WISC, WISC-R) should take into an account of acculturation factor for Native children.

4. Discussion: Is There Alternative Approach to Measuring Intelligence of Minority Children?

The item difficulty pattern of WISC-R subtest showed a cultural content bias against minority groups. The study on measuring intelligence of Native children indicated some cultural biases in question items of the WISC-R Information subtest. In addition, the LD pattern of Bannytne's recategorization was not observed among LD Indian children when they grew up in a traditional Native settings. Therefore, the degree of acculturation may affect intelligence scores of minority children. Then, what is the possible approach to assess the intelligence of children from the outside of the main-stream culture? Two attempts to assess intelligence of minority children are examined in this section; first, cultural free (or fair) tests to remove cultural effects on IQ scores, and second, re-calculation of IQ scores using an Estimated Learning Potential to predict academic success without interference of cultural effects.

To eliminate the cultural influence, Cattell designed the

Cultural Free Test which consisted of entirely nonverbal materials. The shorter revised version is called the Personality and Ability Testing (IPAT) Cultural Free Intelligence Test. The test was intended to ensure the results of IQ tests freedom from bias by cultural learning effects (Smith, 1959). In 1950s, the Cultural Free Test was evaluated as containing a high reliability and validity (Drake, 1953; Schwesinger, 1953; Smith, 1959).

Milholland (1965), however, pointed out that five references of the manual cited for Scales 2 and 3 did not provide any evidence of the 'g' saturation of the tests. Besides, a few cross-cultural studies cited by the manual are not readily available in the literature. In addition, "these results hardly seem to furnish definitive evidence of the outstanding freedom from culture effects of the culture fair test" (Milholland, 1965, p. 721). The IPAT Cultural Free Test are constructed on the basis of the concept of crystallized and fluid intelligence which cannot be clearly separated from each other in the scores on the tests. Occasionally, black children are reported to find cultural free (or fair) tests are more difficult than verbal tests (Sattler, 1982).

As another means to assess the learning abilities of children from minority groups, Mercer and Lewis (1978) proposed to use an Estimated Learning Potential (ELP). Since WISC-R is useful to predict an academic success of students, WISC-R serves as a measure of School Functioning Level (SFL). However, children from minority groups cannot be evaluated solely against

the standard WISC-R norms. Hence, Mercer suggested using ELP scores, to be calculated by re-adjusting the WISC-R scores in consideration of child's socio-cultural characteristics.

Oakland (1983) conducted the study of concurrent and predictive validity for both WISC-R and WISC using 396 children from Grades 1 to 8 analyzed on the basis of racial-ethnic groups (Anglo, Black and Mexican American) and social classes (middle and lower). The subtests of the California Achievement Test were used to measure abilities of English-reading and mathematics as criteria. The study found that concurrent predictions of reading and mathematics achievement are made more accurately with WISC-R IQ scores than with ELP scores, and that predicting achievement three years later (1976-1979) was likely to be make more accurately with WISC-R scores than ELP scores (Oakland, 1983). Thus, the WISC-R score modifying method of ELP scores resulted in a decrease of predictive power.

As Vernon (1969) pointed out, Cattell misstated that fluid ability tests are largely immune to cultural influence; actually, the skills of these tests (fluid ability tests or cultural free tests) "would appear to be built up in just the same way as those involved in verbal reasoning" (Vernon, 1969, p.25). In other words, since even mathematical concepts including spatial and sequential understanding are taught at school differently according to each cultural context, the cultural experience of children will also affect performance of nonverbal tests. The attempt at computing an ELP also failed to predict a child's

academic success. A simple re-calculation of WISC-R scores on the basis of family size, family structure, socio-economic status and urban acculturation does not indicate so-called Estimated Learning Potential; ELP scores cannot predict school achievement more accurately than WISC-R scores. These two attempts at cultural free tests and ELP scores failed to assess the intelligence of minority groups as a predictor of a child's school achievement.

As long as the purpose of IQ tests remains to predict scholastic performance in Canadian main-stream schools for child placement and counselling, the tests should be able to measure those abilities most relevant to the curriculum and type of instruction which were shaped largely European and North American middle-class populations. Therefore, IQ tests ironically have to contain a certain degree of cultural bias toward children with non-main-stream cultures in order to have a reasonably high correlation with an academic success at school. Accordingly, IQ tests will be able to provide more accurate prediction for child's academic success when these IQ tests reflect a certain degree of the cultural context of the dominating school environment.

Still, as pointed out earlier in this paper, the results of IQ tests could be influenced by various factors of the child's cultural background, primary language and handicapped conditions. Maintaining a tolerant view towards cultural bias in IQ tests implies the necessity that the minority child adjusts to the

main-stream culture, which may result in the rejection of the child's own cultural heritage. This view is often cast as 'assimilation' and considered not to be of value to maintain the cultural identity of minority groups. Since Canada proposed 'multiculturalism' in the Constitution Act, 1982, education system should play a role to preserve and enhance the multicultural heritage of Canadians.

Furthermore, the commonly-used IQ tests in Canada do not necessarily represent the child's true general ability, even though these tests will have a reasonable predictive power of child's academic success at Canadian schools. Therefore, though a compromise, but the most careful and sensitive approach to assess intelligence of Canadian minority children have to be a multiple assessment approach using already established tests as a part of the information used to assess a child's learning abilities in order to facilitate adequate education and counselling.

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